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Title:

**SELECTABLE WIDTH TRACK APPARATUS AND METHOD FOR A GRAVITY  
FED SHELVING SYSTEM**

Kenneth A. Shaw

6N002 Dunham Road  
Wayne IL 60184  
Citizen: United States of America

Edward I. Knorring, Jr.

616 West Elm  
Wheaton, IL 60187  
Citizen: United States of America

Henry Massett

9540 Avers  
Evergreen Park, IL 60805  
Citizen: United States of America

Joseph Coretti, Jr.

303 Birch Drive  
Wheaton, IL 60187  
Citizen: United States of America

**A SELECTABLE WIDTH TRACK APPARATUS AND METHOD  
FOR A GRAVITY FED SHELVING SYSTEM**

**RELATED APPLICATIONS**

This application is related to pending U.S. Application No. 09/915,957,  
filed July 25, 2001.

**FIELD OF ENDEAVOR**

This invention relates to gravity fed shelving for product conveyance,  
such as at the retail level and, more particularly, to conjoined roller tracks for the  
gravity fed shelving having a selectable track width.

**BACKGROUND**

Roller-type gravity fed shelving is typified by the roller-type  
commodity stand of U.S. Patent No. 6,089,385, and the conveyor of U.S. Patent No.  
5,048,661. Additionally, there are also the "Volume Master" (Trademark) gravity  
flow tracks made by Anthony Manufacturing Company, Inc., of San Fernando,  
California. Finally, the assignee of the present application also has long made its  
Nyla-Rol® gravity flow shelving. Particularly, rollers transversely mounted at spaced  
locations along one or more track members, and with their uppermost height stationed  
at a point above the tracks, are used to roll-convey product along the track. In a  
gravity-fed alignment situation, the rear of the track is higher than the front or  
dispensing end, and product is fed by gravity and rolls to the frontmost available  
position along the track.

Because of the various products needing conveyance, e.g., half gallon  
milk containers on the one hand versus smaller soft drink cans and cartons of half and  
half cream on the other hand, product widths vary greatly. When used in retail sales  
settings, e.g., convenience stores, it is important that such gravity fed roller tracks not  
only operate smoothly, continuously feed the product to the front without a product  
"hangup" on any portion along the track, and can be easily installed and cleaned but  
that the tracks easily accommodate the various product widths. When the product

widths vary greatly, different track widths, i.e., different structural track members, are needed in the prior art to accommodate large width differences.

## SUMMARY

5           According to an aspect, a gravity flow roller track system for transporting product containers is disclosed including a roller track having a roller tray having a bottom and first and second side supports. The first side support is comprised of a first support wall, a first extension wall, and a guide wall, with the first support wall extending substantially normal to the bottom, the first extension wall  
10       extending downwardly and outwardly from a top edge of the first support wall, and the guide wall extending substantially normal from an outside edge of the extension wall. The second side support is comprised of a second support wall and a second extension wall, with the second support wall extending substantially normal to the bottom and having a plurality of apertures therein that are configured to receive a  
15       joining clip. The second extension wall extends downwardly and outwardly from a top edge of the second support wall. Each of the first and second support walls also include a plurality of spaced recesses. A plurality of rollers having first and second ends is further included, with the first and second ends being mounted in the plurality of recesses.

20           According to another aspect, a selectable width gravity feed roller system is disclosed with a first roller tray having a plurality of rollers and first and second sides being fixedly separated, wherein the first and second sides support the rollers. The first side has a first height and the second side has a second height that is  
25       less than the first height. Also, a second roller tray is included having a plurality of rollers and first and second sides being fixedly separated, with the first and second sides supporting the rollers. The first side has a first height and the second side has a second height that is less than the first height. Finally, a joining clip is included that is operable to connect the first roller tray to the second roller tray.

30           According to yet another aspect, a clip is disclosed for joining a plurality of roller trays in a gravity feed roller system, wherein each of the roller trays comprises a side defining a plurality of apertures. The clip includes first and second

sides respectively having at least one protruding tine configured to engage with respective ones of the plurality of apertures to connect two or more of the plurality of roller trays.

5                   According to yet a further aspect, the clip is further disclosed to include generally vertically-oriented slots to receivably retain a removable divider bar member to selectively separate the respective roller dispensing surfaces of the plurality of roller trays.

10                   According to yet another aspect, a gravity feed roller system for dispensing products is disclosed that includes a plurality of rollers, a plurality of roller trays each having first and second vertical sides supporting the rollers to form a first roller dispensing surface. The first vertical side has a first height and the second side has a second height that is less than the first height. Also included is a means for  
15                   connecting at least two of the roller trays along the second sides to form a second roller dispensing surface, the second roller surface including at least two of the first roller dispensing surfaces.

                    According to still another aspect, a method providing selectable  
20                   dispensing surface widths for use in a roller track system for transporting product containers is disclosed. The method includes providing first and second roller trays, each having a plurality of rollers defining respective first and second dispensing surfaces. The first and second roller trays are connected together at respective joining surfaces of the first and second trays with means for connecting the trays, wherein the  
25                   joining surfaces of the first and second trays do not extend in an upward direction above the first and second dispensing surfaces defined by the plurality of rollers and a third dispensing surface is correspondingly defined from a combination of at least a portion of the first and second dispensing surfaces. A removable divider member may be selectively disposed between the first and second roller trays, where the member is  
30                   operable to selectively divide the third dispensing surface.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a perspective view of a selectable width gravity flow roller track system constructed in accordance with the teachings of the present invention.

FIG. 2 is a perspective view of the partially disassembled system shown in FIG. 1.

FIG. 3 is a cross-sectional end view of a roller track frame as used in the system of FIG. 1.

FIG. 4 is a side view of the roller track illustrated in FIG. 3.

FIG. 5 is a cross-sectional end view of the roller track system of FIG. 1.

FIG. 6 is a perspective view of a joining clip used in the roller track system of FIG. 1.

FIG. 7 is a top view of the joining clip of FIG. 4.

FIG. 8 is a side view of the joining clip of FIG. 4.

FIG. 9 is a cross-sectional side view of the joining clip of FIG. 4.

FIG. 10 is a perspective view of the selectable width gravity flow roller track system of FIG. 1 with a divider bar selectively removed to accommodate a larger product.

## **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

The presently disclosed system is a selectable width gravity feed roller track system, as shown generally by reference 2 in FIG. 1. While the track system 2 is generally used as a gravity feed system, meaning that the track is angled so as to allow gravity to pull conveyed products forward to a dispensing position, it is to be understood that the presently disclosed system may be employed for other types of roller conveyors including horizontal conveyors. Furthermore, while the gravity feed roller track system 2 will be described below primarily for use with product movement within refrigerated display cases used in convenience stores, refrigerators of boxed bulk food shelving at warehouse food stores and refrigerator dairy-to-retailer roller shipper/display shelves, it is to be understood that the disclosed system may be employed in other situations requiring product conveyance. Moreover, by selectable width, it is meant that the roller track system may convey products of a particular size,

preferably in parallel as illustrated in FIG. 1, and also may convey larger products by the same system through modification, such as by removal of a divider bar, in order to convey these larger products as illustrated in FIG. 10, for example.

5                   As shown in FIG. 1, the selectable width roller track system 2 includes a plurality of roller frames or trays 4 within which are mounted a plurality of rollers 6. Each roller tray 4 has a bottom or base 8 that is substantially planar in shape. The roller tray 4 also includes first and second side edges or supports 10, 12 that extend  
10                   vertically upward or substantially normal to the base 8. The bottom 8 serves to support and fixedly separate the first and second supports 10, 12 substantially parallel to one another, but it will be appreciated by those skilled in the art that other means and arrangements such as supports at the ends of the first and second supports 10, 12 could be used to support and fixedly separate the supports 10, 12 parallel to one another.

15                   As further shown in FIG. 3, the first and second side supports 10, 12 each include an extension wall 14 having an essentially identical height 16. The first side support 10 also includes an extension wall 18, which extends downward and outwardly from a top edge 20 of the first support wall 14. As illustrated in FIG. 3, the  
20                   first extension wall 18 extends away from the extension wall 14 of the first support 10 at an acute angle  $\alpha$ . Preferably, the angle  $\alpha$  is approximately 75 degrees, but may range from approximately 45 degrees to 85 degrees. The importance of this range of angles will be discussed further in detail.

25                   As further shown in FIG. 3, the first support wall 10 also comprises a guide wall 22 that extends vertically from an outside edge 24 of the extension wall 18. As shown in FIG. 3, the guide wall 22 extends substantially normal to the base 8 of the roller tray 4. The guide wall 22 and the extension wall 14 are substantially parallel and offset by a distance  $\delta$ , which is equal to the width of the extension wall  
30                   18. Furthermore, as may be seen in FIG. 3, the first support 10 is substantially "z-shaped" in its vertical cross section. The importance of this shape will be discussed in further detail to follow.

The second support wall 12 also includes an extension wall 14, as discussed previously. A second extension wall 26 extends downward and outward from a top edge 28 of the extension wall 14 of the second support wall 12. As shown in FIG. 3, the second extension wall 26 extends downward at an acute angle  $\beta$  from the plane of extension wall 14. Preferably, this angle  $\beta$  is approximately 45 degrees but may be less than or greater than this particular angle up to approximately 85 degrees. This angle, however, is selected, by taking account of the length of second extension wall 26, to allow a spacing or gap between two roller trays 4 that are connected to one another, as will be described later.

Turning to Figs. 2 and 4, each roller tray 4 further includes a plurality of spaced recesses 30 for journaling of the rollers 6 within the tray 4. Each of the recesses 30 is formed in the extension walls 18 and 26 and the support walls 14 of the first and second supports 10, 12. The recesses 30 are formed so as to substantially frictionally engage and retain hubs 32 of the rollers 6 located at each end of the rollers 6, while allowing the rollers 6 to rotate freely. In order to accomplish this retention, top portions of the spaced recesses 30 are configured slightly smaller in diameter than the roller hubs 32.

Referring to FIG. 5, it is noted that the placement of the recesses 30 within the first and second supports 10, 12 as well as the diameter 36 of the rollers 6 are selected such that a top edge 38 of the rollers 6 extends above the first and second extension walls 18, 28. A benefit of such positioning is that a product 40, as shown in phantom lines in Figs. 1 and 5, may roll on the rollers with adequate clearance between a bottom surface 42 of the product 40 and the extension walls 18 and 28. In concert with such clearance, the guide wall 22 ensures lateral positioning of the product 40. Accordingly, the product 40 may remain correctly positioned on the roller track 4 as well as freely moving along the roller track 4 when positioned at a sufficient incline to ensure gravity feed of the product 40.

Turning again to FIG. 3, it is further noted that the heights of the supports for each roller tray 4 are preferably asymmetric wherein a height 44 of the first support 10 is greater than a second height 46 of the second support 12. Further, as may be seen in FIG. 5, the top edge of the rollers 6 is extended above the second height 46, which is the height of the second support 12, but preferably is below the height 44 of the first support 10 in order to allow the guide wall 22 to promote lateral positioning of the product 40, as discussed previously.

A feature of the selectable width roller track system 2 illustrated in FIG. 1 is the connection of at least two roller trays 4, which may be selectably divided into two separate dispensing surfaces or converted into a single dispensing surface. In order to accomplish this selectability, the system 2 features a plurality of joining clips 48 that are configured to join to roller trays 4 as illustrated in Figs. 1, 2 and 5. The clips 48 are provided with a plurality of protruding tines 50 that are configured to cooperate with groupings of apertures 52 defined within the extension wall 14 of the second supports 12 of each roller tray 4. Specifically, the tines 50, as shown in FIG. 6, are configured to insert into corresponding apertures in the aperture groupings 52 and affix the joining clip 48 to two roller trays 4 on first and second sides 54, 56 of the joining clip 48, thereby conjoining or connecting two roller trays 4. Preferably, each aperture grouping 52 includes a pair of apertures 58 as shown in Figs. 2 and 4 that correspond to a pair of tines 50 on each of the respective sides 54, 56 of the joining clips 48.

The tines 50 of the joining clips 48 are configured preferably with an arrow shape as illustrated in FIG. 7 and comprise a center post 60 that is connected to one of the sides 54, 56 of the joining clip 48. A pair of flexible arms 62 are attached to an end portion 64 of the center post 60 and extend away therefrom at an angle thereby forming the arrow shape profile as seen in FIG. 7. The flexible arms 62 are configured such that they have a normal biased position. When the tines 50 are inserted into the locking apertures 58, however, the flexible arms 62 are configured to allow movement of the arms 62 toward the center post 60. The length of the flexible arms 62 is selected such that a gap  $\gamma$  exists between ends of the flexible arms and the



sides 54, 56 of the clip 48. Thus, when the tine 50 is fully inserted into the locking aperture 58, the flexible arms 62 are able to return to their normal biased position thereby locking the tines 50 into the apertures 58. It will be appreciated by those having skill in the art that the particular arrow shape of the tines 50, which enable locking of the clip 48 to the roller tray 4, may be formed in numerous different configurations that provide locking of protruding tines or nipples to a corresponding aperture. Additionally, the clips 48 are preferably made of an injection-molded plastic material, but may be constructed from any other suitable material.

Each of the joining clips 48 further comprise a top portion 66 as shown in Figs. 6-8 that includes at least one slot 68 defined therein, which is generally vertically oriented. The purpose for the slot 68 is to engage and receivably retain a removable, elongated divider bar member 70 that may be selectively placed in the roller track system to divide a singular large dispensing surface 72, as is illustrated in FIG. 10 and that can convey a large product 74, e.g., a gallon container of milk, into a first dispensing surface 76 and second dispensing surface 78 as shown in FIG. 1 that each can respectively convey a smaller product 40, e.g., a half gallon or a quart of milk. It is noted that the FIG. 1 illustrates that the first and second dispensing surfaces 76, 78 are substantially the same width. However, the widths of the first and second dispensing surfaces are not limited to the same width, but could also have differing widths. Additionally, it will be appreciated by those skilled in the art that the singular large dispensing surface 72 may consist of at least a combination of the first and second dispensing surfaces 76, 78, as shown, or a combination of portions thereof. Moreover, it will be appreciated that the introduction of the divider bar 70 to divide the width of large dispensing surface 72, will yield widths of the first and second dispensing surfaces whose sum width will be slightly less than the width of surface 72 due to the width of the divider bar 70.

In order to engage the elongated divider bar 70 with the slots 68, the divider bar 70 includes a plurality of tabs 80 that are configured to matingly insert into the slots 68 as illustrated in FIG. 2. Furthermore, these tabs 80 may be defined by a pair of cutout slots 82 formed in a bottom edge 84 of the divider bar 70, thereby

defining tab 80 as further illustrated in FIG. 2. In order to ensure proper seating of the divider bar 70 into the slot 68 defined in the top surface 66 of the joining clips 48, a pair of partial slots 86 may further be formed in the top surface 66 of the joining clips 48. Accordingly, a portion 88, shown in FIG. 7, in the top surface 66 defined between  
5 the slot 68 and the respective partial slot 86 may positively engage with the cutout slots 82 defined in the bottom edge of the divider bar 70 to positively hold the bar 70 in place and prevent movement thereof.

Each of the plurality of joining clips 48 is further configured to have a  
10 predetermined thickness 90 that will ensure that the divider bar 70 has access to at least the slots 68 defined in the top portion 66 of the clips 48. The predetermined thickness 90 is selected taking into account the horizontal distance  $\lambda$  of the second extension walls 12 of each roller tray 4 as illustrated in FIG. 3. As mentioned previously, the angle  $\beta$  is selected to further ensure that the divider bar 70 has access  
15 to the slot 68 in the top portion 66 of the joining clips 48. As is evident, the lesser the angle  $\alpha$ , the lesser the distance  $\lambda$  becomes. When two of the roller trays 4 are connected together with the joining clips 48, a gap 92 as shown in FIG. 5 is defined between the extension walls 26 of the two connected roller trays 4 that permits insertion of the divider bar 70 into the slots 68 of the joining clips 48.

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As a further feature to assist in connecting the joining clips 48 to the extension walls 14 of the second supports 12 the joining clips 48 may further include a locating lug or guidepost 94 located on each of the sides 54 and 56 of the joining clip 48 as illustrated in Figs. 6 and 7. These guideposts are configured to mate with a  
25 guide aperture 96 that is part of the aperture groupings 52. Preferably the guideposts 94 have a length greater than the length of the tines 50 such that the guideposts 94 engage with the guide apertures 96 prior to the tines 50 engaging with the locking apertures 58 during insertion. Thus, the insertion of the guideposts 94 into the guide apertures 96 ensures that the joining clips 48 are properly located in a prescribed  
30 position where the tines 50 will properly engage with the locking apertures 58.

It is noted that the means used to connect two roller trays 4, namely the joining clips 48 and associated aperture groupings 52, is only one conceivable means of fastening two roller trays 4 together in order to effect a selectable width gravity feed roller system. It will be appreciated by those of ordinary skill in the art that other means to fasten the roller trays 4 together may be employed such as screws, nuts and bolts, soldering, welding, clips, bars, elastic bands, magnets and other conceivable fastening means in the present system in order to join two trays 4 together. Furthermore, the divider may be comprised of any suitable means that allows the larger dispensing surface 72 to be divided into the respective first and second singular dispensing surfaces 76 and 78 by locating the divider at the junction of the second supports 12 of the roller trays 4.

While the present disclosure has explained particular examples, it will be apparent to those of ordinary skill in the art that the scope of this disclosure is not limited to those examples. On the contrary, this patent covers all apparatus as falling within the spirit and scope of the appended claims, either literally or under the doctrine of equivalents.